2014

Predicting from Spatial Data & Statistics - Stephen Peplow (School of Business, Business and Quantitative Methods)

Kwantlen Polytechnic University. Office of Research and Scholarship.

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Spotlight

Faculty Researcher Profile

School of Business

Predicting from Spatial Data & Statistics

Snapshot

Dr Stephen Peplow is a faculty member in the School of Business at KPU whose research interests are in geographical information systems (GIS), statistics and agent-based modeling. His focus is on agricultural issues, especially the true value of farmland. An advocate for open-source software and 'data liberation', Stephen makes the code and datasets for his research projects available online. For example, the code and maps for his current research on the relationship between newly-laid railway track and agricultural rents can be found at here. An example of his agent-based modeling can be found at here, and Google Scholar citations can be found here.

Key Research

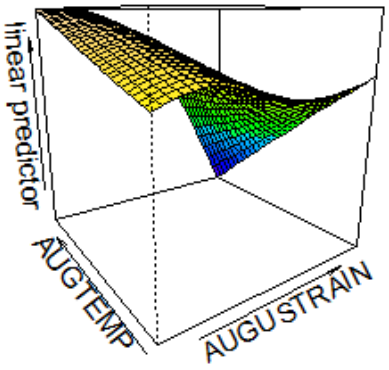
Over the past two years Stephen and two hard-working KPU students (Malcolm Little and Amy Zhang) have worked as a team to explore data from two centuries ago. By analyzing older and difficult to find data, Stephen and his co-researchers have developed skill sets in predictive modeling and constructing explanatory variables from unusual sources. These skills can be transferred to contemporary problems, such as the effect of climate change on agriculture.

Stephen's collaborative research projects include:

- Using archival data from Britain in the 1840s to develop a county-by-county map of each county's economic dependency on wheat growing. This unusual variable is then used to predict voting over the famous Repeal of the Corn Laws in 1846 (results published in the respected peer-reviewed International Journal of Humanities and Arts Computing, Fall 2014)

Dr. Stephen Peplow

The non-linear effect on wheat yields of various combinations of temperatures and rainfall in August, which we can use it to simulate yields under various climate change scenarios.



- Using modern econometric methods to test the integrity of the 1836 Tithe Commutation Commission Files (results are in the European Science Journal. August 2014)
- Using non-parametric methods to model the non-linear relationship between the growth of wheat and the temperature and rainfall it experiences (paper will appear in the peer-reviewed journal of Agricultural and Food Economics)

Stephen's recent accomplishments include:

- Developing a predictive model for use by universities which provides the probability that any individual prospective student who receive an offer letter will actually enroll (results are in the peer-reviewed journal Transformative Dialogues, July 2014)
- Receiving a grant from KPU and Environment Canada to map crops to locations in South Delta for the past ten years. This map is to be used in this work:
    1. Modeling the decision-making process a farmer follows when deciding whether to convert his/her land to berry farming. By understanding this decision-process, land predictions can be made and assessed for potential environmental costs should development occur. Stephen is building an agent-based model into which different scenarios, such as costs and demands, can be fed.
    2. Estimating the true value of South Delta's Agricultural Land Reserve and its environmental benefits.

Impact of Research

Stephen's research is suggesting new ways to collect and interpret scarce data, especially when 'proxy' data has to be used. His use of grant money to support Kwantlen students to research has increased the number of students who graduate with hands-on experience of research and publication in peer-reviewed journals..

What's Next?

Stephen plans to focus on building models which help both farmers and agricultural policy-makers to incorporate a large range of potential and actual changes in climate into their plans. He is working on a desktop agent-based model application, which farmers can use when planning their production pattern.

Check out Stephen Online:

- http://stephenpeplow.com/